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ENGINEERING TESTS  
OF  
SINGLE 105MM AMMUNITION WOOD BOX

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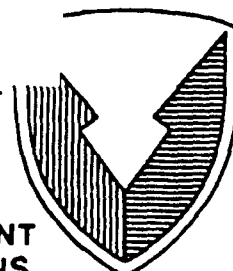


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EVALUATION DIVISION  
SAVANNA, ILLINOIS 61074-9639

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19. ABSTRACT (Continue on reverse if necessary and identify by block number)  U.S. Army Defense Ammunition Center and School (USADACS), Evaluation Division, (SMCAC-DEV) was tasked by the U.S. Army Armament Research, Development and Engineering Center (ARDEC), SMCAR-ESK, to conduct compression and drop tests on a Single 105mm Ammunition Wood Box. This report contains the procedures, results and conclusions from the tests conducted.															
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U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL  
Evaluation Division  
Savanna, IL 61074-9639

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ENGINEERING TESTS

OF

SINGLE 105MM AMMUNITION WOOD BOX

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PART 1

INTRODUCTION

A. BACKGROUND. The U.S. Army Defense Ammunition Center and School (USADACS), Evaluation Division, was tasked by the U.S. Army Armament Research, Development and Engineering Center (ARDEC), SMCAR-ESK, to test a single 105mm Ammunition Wood Box.

B. AUTHORITY. This test was conducted in accordance with mission responsibilities delegated by ARDEC, Rock Island, IL.

C. OBJECTIVE. The objective of this series of tests was to assess the strength of the 105mm Ammunition Wood Box and provide ARDEC, SMCAR-ESK, with documentary photographs.

PART 2

ATTENDEES

Jason B. Solberg  
Test Engineer  
AV 585-8079  
Comm. (815) 273-8079

Mark Rehmstedt  
AV 793-8206

Director  
U.S. Army Defense Ammunition  
Center and School  
ATTN: SMCAC-DEV  
Savanna, IL 61074-9639

Commander  
U.S. Army Armament Research,  
Development and Engineering Center  
ATTN: SMCAR-ESK  
Rock Island, IL 61299-7300

### PART 3

#### TEST PROCEDURES

A. STACKING TEST. The single wood box shall be loaded to simulate a stack of identical unit loads stacked 16-feet high, for a period of one hour. This stacking load is simulated by subjecting the box to a compression of weight equal to an equivalent 16-foot stacking height. The compression load is calculated in the following manner. The box weight is divided by the box height in inches and multiplied by 192. The resulting number is the equivalent compressive load of a 16-foot-high stack.

B. DROP TEST. Five free fall drop tests were done from four feet high by specifications of ARDEC, SMCAR-ESK. The sequence of drops were done as follows: bottom face, top face, front face, right side face, then left rear edge.

PART 4

TEST EQUIPMENT

A. TEST SPECIMEN.

- a. Type: 105mm ammunition wood box
- b. Length: 43.75 inches
- c. Width: 14.25 inches
- d. Height: 9.5 inches
- e. Weight: 143 pounds

B. COMPRESSION TESTER.

- a. Manufacturer: Ormond Manufacturing
- b. Platform: 60 inches by 60 inches
- c. Compression Limit: 50,000 pounds
- d. Tension Limit: 50,000 pounds



## PART 5

### TEST RESULTS

A. STACKING TEST. The box was loaded to 3,010 pounds compression initially, and had decreased to 2,710 pounds after 20 minutes. The load was then brought back up to 3,010 pounds and after 11 minutes had decreased to 2,900 pounds. Finally, the load was brought back up to 3,070 pounds and at the end of the test had decreased to 2,970 pounds. No damage was noted.

B. DROP TEST. The box was initially dropped four feet onto its bottom front edge by pushing it off of the fork tines of the forklift truck. This test resulted in failure. To better simulate expected conditions, a new box was then loaded with the same inert load and banded. This box was dropped from the same height with a quick release mechanism. The drops were done on the bottom, top, front and right side surfaces as well as the left rear edge. The face drops showed no damage; however, the edge drop caused some disengagement of board fasteners.

## PART 6

### CONCLUSIONS

A. CONCLUSIONS. There were no problems during the compression test. The first drop test was not considered valid; however, after use of the quick release mechanism the box passed the series of drop tests. Also, note that the box was banded with 3/4" steel strapping, as required by the appropriate packaging drawing.